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ABSTRACT

At LaGuardia Community College (LCC), technology has become central to the college curriculum, and has enriched the college's cooperative and secondary education programs. In addition to employing technology to accommodate various teaching/learning styles at the college, LaGuardia provides students with as many opportunities as possible to use computers in all disciplines. LCC operates 22 instructional, tutoring, and basic skills laboratories in which computers are networked and maintained by faculty and staff. At LCC each matriculated day student participates in three cooperative education internships before graduation. Designed to integrate general and technological education, these internships often expose students to and train them in the application of new technologies in a variety of fields, including health, architecture, business, engineering, and education. LCC also operates two highly successful alternative high schools: the Middle College, designed for high-risk adolescents; and the International High School (IHS), created for immigrant students for whom English is a second language. One factor leading to the success of these two schools has been the incorporation of technology into the curriculum. Upon entry into the schools, all students learn word processing functions, basic programming, and computer graphics and business application programs. Many, previously considered "high risk" or "language deficient," become involved in the advanced manipulation of technology through innovative courses. For example, "Motion," a course taught jointly by faculty from LCC and IHS, employs computer-assisted instruction and a thematic, interdisciplinary approach to teach high school students math, physics, literature, and physical education. (JMC)

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INFUSING TECHNOLOGY INTO EDUCATION

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Tidewater Community College
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President
April, 1992

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INFUSING TECHNOLOGY INTO EDUCATION

For too long, some academics considered including of technology in the classroom to be at cross purpose to quality education. Others believed technical education to be the stepchild of the liberal arts. I consider technology the sibling that could keep us economically competitive as we approach the 21st century. As for today's economy, it's much easier to bash Japan for our shortcomings than to incorporate technologies into our curricula. Community colleges have been a prime mover in infusing the technologies into the classroom. The increased number of underprepared students, coupled with reduced government

funding, makes technology all the more important to assure a quality education.

Fifteen years ago, when many of the baby-boomers were finishing college, we heard that college enrollment would suffer a drastic decline in the next 20 years. But, many of those so-called "soothsayers" did not consider community colleges in their predictions. Despite their forecasts, enrollment in community colleges has continued to increase at a moderate, but steady rate. Today more than 50 percent of all college freshman enroll in two-year colleges. Yet, we remain in the higher educational cellar regarding funding. One of the few ways that we can compensate for this disparity is through the use of technology.

Community colleges throughout the country have incorporated a variety of technologies into their curricula with positive results. I want to share with you three ways that my college has used technology to enrich education: first, by making technology central to our college curriculum and embracing the potential of technology; second, by using our cooperative education program as a vehicle for integrating general and technological education; and third, by reaching out to help secondary education reach its potential through technology. The goal of these initiatives is to prepare our students for the 21st century by strengthening our nation's economic position through cooperation.

The value of infusing technology into our academic programs did not come about by chance. Community colleges have always been in a unique position to integrate academic and technological education. Community colleges show the way to other colleges because our vocational programs have, of necessity, changed with the times. For example, at LaGuardia, our Data Processing Program has evolved into a Computer Information Systems approach with Computer Science as well as Technology and Telecommunications options. Our Secretarial Science Department has become the Office Technology Department in recognition of the automated office. Our Accounting Program was one of the first to offer a course in Accounting

Applications on the microcomputer. Community Colleges have always grappled with the challenge of combining general, liberal arts education with preparation for the workplace.

Little research has been done regarding the adaptability of some two-year college students to technologies. However, at LaGuardia, Ruth Lebovitz, a student services professor, made a significant discovery about how to use technology to serve students in a different way. She tested over 750 science and business students to determine their learning styles. By using the Myers-Briggs type indicator, she found that over 80 percent of the college's students were "sensing" types. They process information and learn most effectively through

their five senses.....sight, sound, touch, taste and smell. For example, when these students perform an experiment in a laboratory and see visible changes, such as color or state, they have a better chance of learning.

The same instrument given to 110 faculty members revealed that more than 70 percent of the faculty are "intuitive" types. Faculty learn and teach by manipulating ideas, abstractions, and concepts. As a result, in most classrooms, there is a mismatch in the learning styles of students and faculty. It is critical that faculty be cognizant of this dichotomy between two different styles. Only then can they shape the pedagogy to facilitate

an optimal learning climate. To close this gap, LaGuardia has established a science study center where students can learn in a variety of modes. These include the increased use of anatomical models, laboratory specimens and tutoring. Faculty develop software that complement the textbooks used in beginning science courses. Through a professional development program, faculty gain an increased awareness of the learning styles of our students. They are now developing and incorporating a variety of instructional strategies that are compatible with our "sensing" students. The problem was that we were teaching in one style, but the students were learning in another. At LaGuardia, technology that allows us to implement what we

have learned about different learning styles is helping our students learn better.

The old assumption was that if students had difficulty writing, they could not operate a computer or keyboard. This assumption has been shattered. Computers have transformed basic skills education across the board from math to writing, from reading to science. Computers allow the student to focus. Computers are non-judgemental. Computers are patient. Also, computers allow the student to produce a professional looking paper immediately. The inclusion of hypermedia and multimedia is adding the dimension of layered information in multiple formats. Thus, we can

increase student attention and interest when we infuse technology into academe. Additionally, the use of computers gives our students hands on experience. It enables them to utilize their learning style, which is "sensing."

We have no choice but to inaugurate our students into the technological world of the 21st century. When they enter the job market, that will be the reality. The typewriter, adding machine, mimeograph and the like are practically relics. Unfortunately, most community college students cannot afford home computers like some of their more fortunate university counterparts. We must make this technology fully available to these students to prepare them for the technology-bound work

place. At LaGuardia, we have committed to giving our students as many opportunities as possible to use computers in all disciplines. We have 22 laboratories at the college and a total of more than 600 machines available for student use. These are found in instructional, tutoring and basic skills laboratories. The computers are networked and maintained by faculty and staff.

When LaGuardia Community College was established more than 20 years ago, it was decided that all matriculated day-students participate in three cooperative education internships before graduation. On-site, students often receive exposure and training in the application of new technologies. They learn

of new scientific technologies at the New York Academy of Science and the Brookhaven Laboratory. Internships at various hospitals expose the students to some latest technological advances in the medical field. By working in various computer laboratories, not only at LaGuardia, but throughout the City University, they begin to understand how technology relates to education al administration. Additionally, architectural, business and engineering firms such as Washington Architects, The American Stock Exchange and IBM, give our students a variety of coop placements.

We have found that cooperative education is an

exciting approach to learning. Students can understand more completely the relationship between theory taught in the classroom and the application found in the work place. These connections pertain not only to the professional and technical disciplines, but to the liberal arts and the humanities. Most of these disciplines manifest themselves within the work place. Students can examine such subjects as interpersonal relationships, work group behavior, culture of the organization and written and verbal communication systems. Through the coop experience, students not only receive a greater understanding of the discipline, key cognitive skills such as analysis, synthesis, problem solving and decision making are reinforced.

Students on their coop assignments have a faculty prepared field guide that structures the learning by directing students to data they are to observe and/or collect. Analyses are guided and a series of reflective questions posed that the students must answer. A seminar taught by faculty serves to link the classroom and work experience. Students discuss their findings, expanding the learning from their particular experience to that of all students in the seminar.

The coop experience allows students to explore and reality test career possibilities. We have found that when students establish appropriate

career goals and develop strategies to achieve them, there is increased motivation that translates into greater academic success. As a result of cooperative education, the students understand more completely the relationship between the theoretical and the applied. By exposing our students to the technologies of the world of work, we prepare them to enter that world with confidence.

Let me introduce how my college has worked with high school students by quoting from a 1986 Ford Foundation Report:

"Imagine an urban high school with 450 students in grades 10 through 12. They attend small classes where they get individualized

instruction and much guidance and encouragement from teachers and counselors. Daily attendance at the school is high, and from 85-90 percent of the students graduate, with the vast majority going on to higher education. No graffiti deface the school walls, and there is no vandalism.

An elite private school? No, a public school in New York City, with a student body made up of former chronic truants on the verge of dropping out, youngsters who entered the school with poor reading and mathematics skills and in many cases emotional and family problems. Before their sophomore year is over, these students have begun to undergo a transformation that has made their school an

object of intense interest by educators throughout the country.

The school, called Middle College, opened in 1974 on the campus of LaGuardia Community College, a two-year institution that is part of the City University of New York. It was one of the city's first alternative high schools for "high-risk" youngsters who find it difficult to cope in a traditional high school. Middle College was founded by Janet Lieberman, a social science professor at LaGuardia, who along with other faculty, was convinced that the community college's resources could be applied to rescuing troubled inner-city high school students. The innovative program they

developed has evolved not only into a successful alternative school but also into a model of collaboration between a public school system and a higher education institution."

Because of our success with Middle College, we were invited to establish a second high school at LaGuardia. Thus in 1985, we pioneered another alternative school, the International High School. To enroll in this program, students must be recent immigrants with less than four years in the United States and for whom English is not a first language. They receive a complete high school curriculum taught with an ESL content area approach. Also, students can maintain and further their native language development through instructional materials and

textbooks in their native languages.

We heterogeneously group all classes at the International High School by language ability, achievement level and grade placement. Collaborative learning strategies encourage students to rely on themselves and each other as they explore their subject in small groups. A major feature of the curriculum is the experiential education program that provides a combination of courses emphasizing the social sciences, with three career internships where students extend their knowledge of English and U.S. culture in real life settings.

An analysis of the operation during the first six

years of International High School has exceeded expectations. Average daily attendance has been more than 90 percent each year. The passing rate for all classes taken is 85 percent, with about one-third of the students enrolled in college-level courses annually. During the past four years, the drop-out rate has been less than seven percent. Graduation and college acceptance rates have exceeded 90 percent.

The placement of the Middle College and International High Schools on a college campus provides many facilities and equipment rarely found in public high schools. These include a broad range of media, a microfilm library, updated science and extensive computer laboratories. Students, many in their low

teens, have access to a variety of technological equipment. There is an exchange of instructors, where faculty from the college teach courses in the high schools and high school teachers instruct in the college. There are also team-teaching situations in which high school teachers and college faculty jointly teach courses to high school and college students. High school students can take college courses for both high school and college credit. These practices increase curricular offerings far beyond what most high schools could provide.

One factor leading to the success of these two programs has been the incorporation of technology into the curriculum. Upon entry into the schools, all students learn word processing

functions using IBM and Apple McIntosh microcomputers. They also become familiar with MS-DOS. The use of word processing in the preparation of assignments and papers across the curriculum is a catalyst in developing English language skills. Additionally, the computer enchances the improvement of writing skills and the acquisition of a second language. These high school students learn programming by using two computer languages, BASIC and LOGO. They also learn computer graphics and business application programs. As they excel in computer usage, they become more proficient in using the keyboard. Many of the students, previously considered "high-risk" or "language deficient" learn at such a rapid

rate they can take advanced computer courses offered at the College.

Teachers in mathematics classes have infused computer assisted instruction by using such software programs as Sunburst's Geometric Supposer. In science classes, students use Apple II GS computers to chart the progress and graph the results of their experiments. CAI not only benefits the teaching-learning experience, but erases any preconceived notion of "technological fear" from the students' minds.

One particular course worth mentioning is "Motion." This program is a joint venture, taught by faculties from LaGuardia Community College and the International High School. Our

collaborative effort enables the high school students to learn math, physics, literature and physical education through an interdisciplinary, thematic approach.

During the math and physics segment, students work in small groups on experiments that explore Newton's laws. Naturally, the students must gather many numerical data. By using Apple's graphical analyzer, they begin to understand the data expressed as curve-linear graphs. Moreover, by connecting sensors to the computer with photo-electric or laser gates, the students' ability to gather data is enhanced dramatically. As faculty provide helpful hints into the understanding of the resulting data,

students can comprehend equations that underscore sophisticated concepts such as Kepler's Laws. These laws show the relationship between orbital radius and period. Thus without knowing it, these high school students, which many in society have written off, begin to learn calculus.

Such advanced manipulation of technology, contrasts with traditional computer usages that focus on repetitive drill and practice. Computer use in most classrooms is often an adjunct to regular class work. In this exciting application, students see technology as a tool that belongs to them, rather than an extension of the instructor. This is an empowering experience, especially for minorities and women,

traditionally alienated from math and science.

There are hundreds of creative ways to integrate academic and technological preparation in higher education and beyond. We need to assure that the integration occurs throughout all levels of education to prepare our students for the 21st century. Our faculties should increase their use of technologies in the teaching/learning process. We cannot blame other countries for our own shortcomings. Instead, must assess our strengths, utilize our technological knowledge and use our resources to prepare for the future together.

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